2001 Defense Standardization Program Award
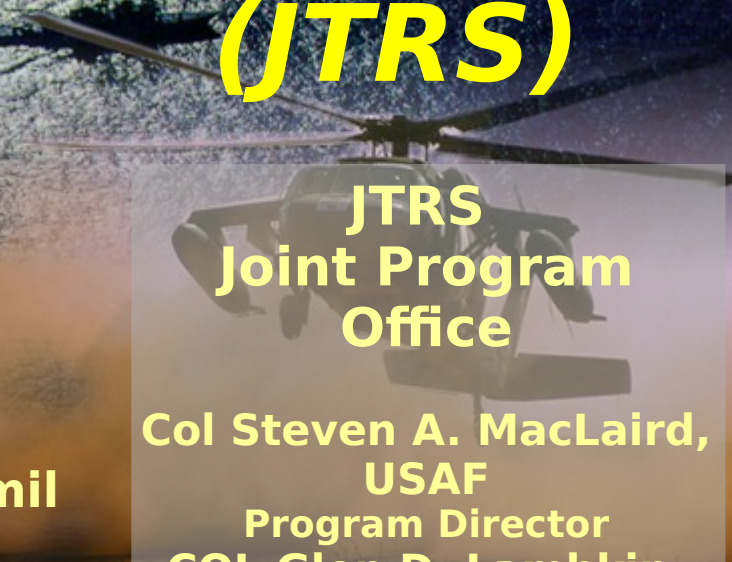
Joint Tactical Radio System (JTRS)

**JTRS Briefing to Industry
26 February 2004**

**http://jtrs.army.mil
703-588-1056**

**JTRS
Joint Program
Office**

**Col Steven A. MacLaird, USAF
Program Director
COL Glen D. Lambkin,**

JTRS Evolution

- **The Program**
- **Changing JTRS Requirements**
  - An Evolving CONOPs
  - OSD Policy
  - Evolving Requirements
    - Operational Requirements
    - Networking Requirements
    - Security Requirements
- **Networking Architecture Strategy**
  - Evolutionary Acquisition Strategy
    - IPv6
    - >2GHz
  - Notional Timelines
  - Critical Technology

Initial JTRS Program

- Based on ORD 1.1
  - Legacy Waveforms, 1 New Waveform (WNW)
  - Limited Network Focus
  - Limited Frequency Bands
  - Limited Data Rates
- Initial CONOPs Concepts Were in Development
  - Led to WNW FDD Development
- Current Acquisition Approach
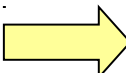 - Clusters - Services
  - Waveforms - JPO

Defense Science Board Pointed to Benefits of JTRS
"…buying a "system" that will lead to a completely new form of communication infrastructure – one that supports such visions as Network Centric Warfare … as well as one that achieves the foundation assumption of information superiority in JV2010."

- The Program
- Changing JTRS Requirements
  - Evolving CONOPS
  - OSD Policy
  - Additional Requirements
    - Operational Requirements
    - Networking Requirements
    - Security Requirements
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  - Evolutionary Acquisition Strategy
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JTRS CONOP

CONOP v1.0
Service Specific

Network CONOP v4.0
Network Centric

New Capabilities Requires New Thinking

JTRS Evolution

- The Program
- Changing JTRS Requirements
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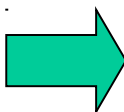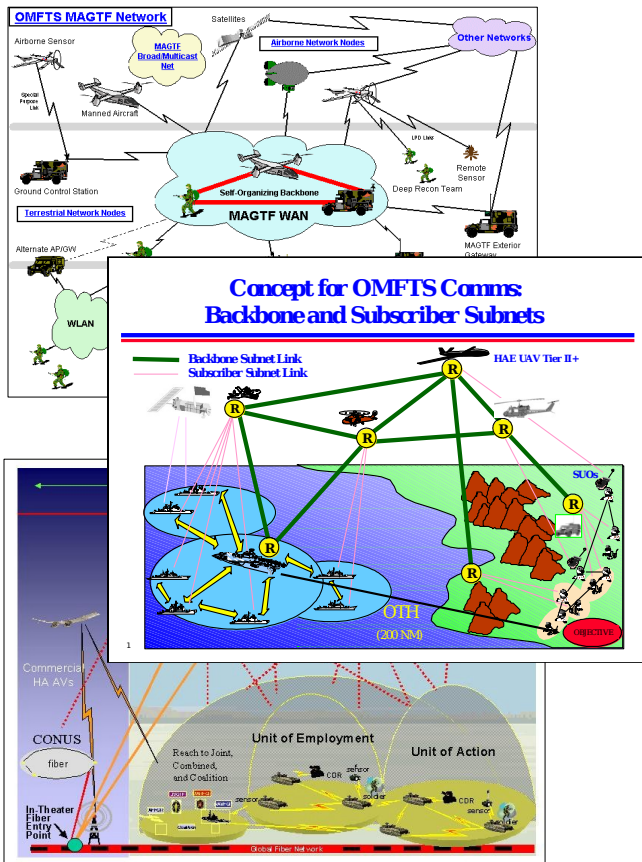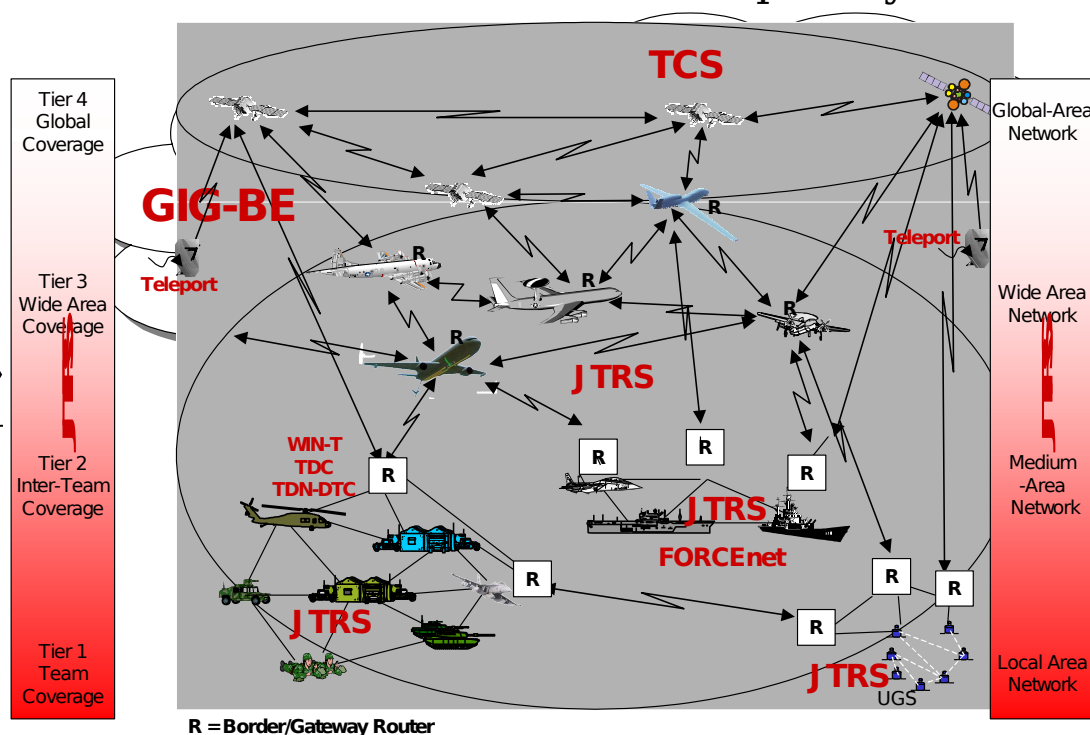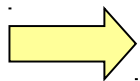 - Critical Technology

OSD/JPO Policies Impacting JTRS

- ASD(C3I) GIG Memo, 31 Mar 00 ~ COI GIG Policy Memo
  - JTRS is the wireless portion of the GIG
- ASD(C3I) Memo, 15 Nov 02 ~ JTRS JPO Responsibilities
  - Designated JPO As Steward of JTRS Networking and Gateway Software
- OSD CIO Memo, 9 Jun 03 ~ IPv6 Implementation Transition Policy
  - GIG assets being acquired shall be IPv6 capable, and interoperability with IPv4
- ASD C3I Memo, 17 Jun 03 ~ RF Equipment Acquisition Policy
  - Expands scope of the JTRS/SCA to all waveforms above 2 GHz
- ASD(NII) Memo,15 Jul 03 ~ Joint Network Centric Capabilities
  - Requires reviews of C4ISR programs which are part of or support the GIG

DoD Chief Information Officer (CIO) Guidance and Policy Memorandum
No. 8-8001- March 31, 2000 - Global Information Grid

DEPUTY SECRETARY OF DEFENSE
1010 DEFENSE PENTAGON
WASHINGTON, DC 20301-1010

MAR 3 1 2000

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
DIRECTOR, DEFENSE RESEARCH AND ENGINEERING
ASSISTANT SECRETARIES OF DEFENSE
GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE
INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE
DIRECTOR, OPERATIONAL TEST AND EVALUATION
COMMANDERS OF THE COMBATANT COMMANDS
ASSISTANTS TO THE SECRETARY OF DEFENSE
DIRECTOR, ADMINISTRATION AND MANAGEMENT
DIRECTORS OF THE DEFENSE AGENCIES
DIRECTOR, NATIONAL RECONNAISSANCE OFFICE
DIRECTORS OF DOD FIELD ACTIVITIES
CHIEF INFORMATION OFFICERS OF THE MILITARY
DEPARTMENTS
DIRECTOR, COMMAND, CONTROL, COMMUNICATIONS AND
COMPUTER SYSTEMS, JOINT STAFF
CHIEF INFORMATION OFFICERS OF THE DEFENSE AGENCIES
DIRECTOR, INTELLIGENCE COMMUNITY MANAGEMENT
STAFF
INTELLIGENCE COMMUNITY CHIEF INFORMATION OFFICER

SUBJECT: DoD Chief Information Officer (CIO) Guidance and Policy Memorandum
No. 8-8001- March 31, 2000 - Global Information Grid

In a memorandum, "Global Information Grid," dated September 22, 1999, the DoD CIO
issued guidance on the definition and scope of the Global Information Grid. In essence, the
Global Information Grid is "a globally interconnected, end-to-end set of information capabilities,
associated processes and personnel for collecting, processing, storing, disseminating and
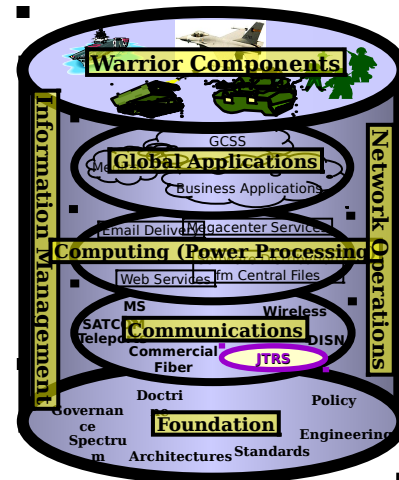managing information on demand to warfighters, policy makers, and support personnel."

The DoD CIO's memorandum represented the first formal output of an initiative that
began in December 1998 to develop policies on several aspects of information management,
including information technology management, for the Department. The initial thrust has been
on the development of Global Information Grid policies and procedures for governance,
resources, information assurance, information dissemination management, interoperability,
network management, network operations, enterprise computing, and aligning the technology
base to support these activities.

U04863-00

goals. While the attached policy guidance is effective immediately, to ensure that this policy is
institutionalized, I direct the DoD CIO, in coordination with the Director, Administration and
Management, to incorporate it into the DoD Directive System within 180 days.

John J. Hamre

Attachment:
As stated

Global Information Grid

The *globally interconnected, end-to-end* set of information capabilities, associated processes and personnel for *collecting, processing, storing, disseminating and managing information on demand* to warfighters, policy makers, and support personnel. The GIG includes all *owned and leased communications and computing systems and services, software (including applications), data, security services* and other associated services necessary to achieve Information Superiority. It also includes *National Security Systems* as defined in section 5142 of the Clinger-Cohen Act of 1996. The GIG supports all *Department of Defense, National Security, and related Intelligence Community* missions and functions (strategic, operational, tactical and business), in *war and in peace*. The GIG provides capabilities from all operating locations (*bases, posts, camps, stations, facilities, mobile platforms and deployed sites*). The GIG provides **interfaces to coalition, allied, and non-DoD users and systems**.

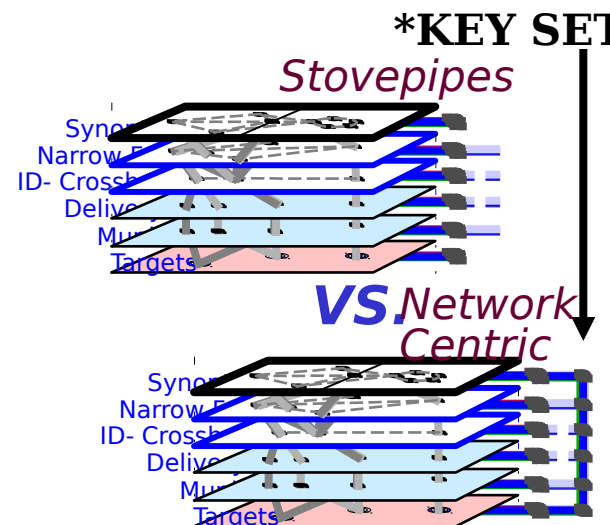*JTRS is the wireless portion of the GIG*

- **Direction from ASD(C3I) Memo of 15 Nov 02**
  - JTRS JPO designated steward of all JTRS waveforms, networking, and gateway software
  - AAE review the roles and responsibilities and JPO plans …particularly to address the networking services inherent in JTRS
  - Critical component… is mobile, ad-hoc, self-forming, self-healing, BLOS networking services with IP Based Standards for all Services/All Networks
  - Discuss strategy, planning and procedures to implement…

- **What was the overarching issue?**

  KEY SET

  Stovepipes

  - No **Joint** approach
  - Many **uncoordinated** programs
    - Lack of system definition (Interfaces & Boundaries)
  - Potential for **stove-piped** networks!

  Sync
  Narrow
  ID- Cross
  Deliv
  Mu
  Targets

  VS. Network Centric

  Sync
  Narrow
  ID- Cross
  Deliv
  Mu
  Targets

JTRS enables the GIG wireless network extension

RF Equipment Acquisition Policy

- ASD (NII) memorandum of June 17, 2003 Subject: Radio Frequency (RF) Equipment Acquisition Policy

  "A recent Department of Defense study and continued technology advancements indicate that expanding the scope of the JTRS/SCA to all waveforms above 2 MHz frequency is now viable. Therefore, to enhance our warfighting capabilities and to improve integration of our communications systems through networking technologies, the reference radio Acquisition Policy [August 28, 1998] is hereby modified to specifically reflect that all such systems, including those operating above 2 GHz, are required to be developed in compliance with JTRS/SCA. The policy is now applicable to all communications waveforms/systems that operate at or above 2 MHz...."

Internet Protocol Version 6 (IPv6)

- DoD CIO memorandum of September 29, 2003 Subject: Internet Protocol Version 6 (IPv6) Interim Transition Guidance

"As described in the reference [DoD CIO memorandum "Internet Protocol Version 6 (IPv6), June 9, 2003"], the DoD has established the goal of transitioning all DoD networking to the next generation of the Internet protocol, IPv6, by Fiscal Year (FY) 2008. A key tenet of the DoD transition strategy is to minimize later transition costs by ensuring that the products and systems that are procured, acquired or in development after 1 October 2003 are capable of operating in IPv6 networks (as well as maintaining a capability to operate in today's IPv4 world)."

"This memorandum provides interim guidance to support the requirement to begin to procure/acquire IPv6 capable GIG assets on 1 October 2003."

- Joint Network Centric Capabilities
  - Requires reviews of C4ISR programs which are part of or support the GIG

NCW Imperative of Interoperability

If you are not interoperable, you are …

- **<u>Not</u> on the net**
- **<u>Not</u> contributing**
- **<u>Not</u> benefiting**

Bottom line:

If you are not on the Net, you have limited impact

Network-Centric Warfare

Creating a Decisive Warfighting Advantage

12

JTRS Evolution

- Initial Program
- Changing JTRS Requirements
  - Evolving CONOPS
  - OSD Policy
  - Evolving Requirements
    - Operational Requirements
    - Networking Requirements
    - Security Requirements
- Networking Architecture Strategy
  - Evolutionary Acquisition Strategy
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  - Notional Timelines
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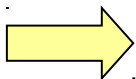
Operational Capabilities

- User Capabilities/Requirements
  - JTRS ORD/CDD Updates
  - Service Specific Requirements (e.g., Low Latency, Urban Terrain, Closure Rates, etc.)
  - Other Program Capability/Requirement Documents
- New and Maturing Technologies
- Lessons Learned From OEF and OIF

Continual ORD/CDD Update Required to Address Evolving Capabilities/Requirements

Networking Capabilities

- Additional Requirements Have Been Identified Since Development of WNW FDD
  - Network Architecture Has Expanded to Address Different Networking Environments and Subnet Topologies
    - Scalability Issues With 100s and 1000s of Nodes
  - High Throughput (10s, 100s, and 1000s of Mbps) Capabilities
  - Additional Data Link Layer and Signals in Space (SiS)
    - SATCOM
    - Low Latency Waveforms
    - Support for Fast Movers
    - Additional Air-to-air Requirements
  - Legacy System Interoperability
  - Networking Security Requirements
    - Evolving HAIPE Specification
    - Crypto Modernization

GIG

TC

GIG
Transport

JTRS Enabled
Airborne
Network

JTRS Enabled
Maritime
Network

Radio

Land Line

GIG-BE

JTRS Enabled
Tactical
Network

JTRS
Enabled
Unmanne
d Ground
Sensors

IP-based
"System-of-Systems"

16
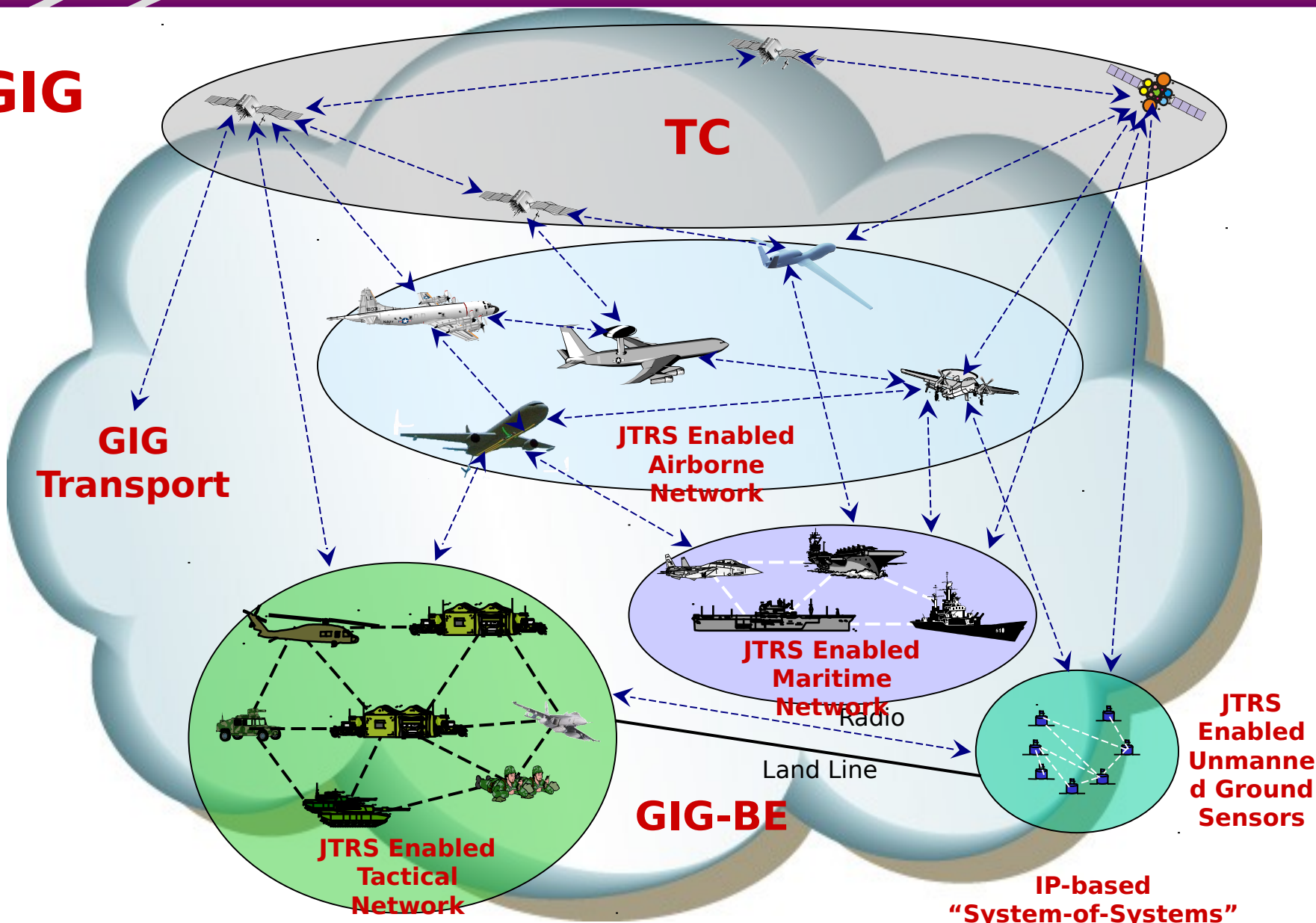
Legacy System Interoperability

- ## Message Format Translator
  - Translate Dissimilar Messages Between Similar or Dissimilar Waveforms
    - JVMF to USMTF, J-series, OTH, etc.
- ## Cross-banding
  - Converting Similar Data and Voice Between Dissimilar Waveforms (e.g., WNW to Link 16, HF to UHF DAMA)
- ## Re-route/re-transmit
  - Redirection and Re-routing of Information Based on IP Datagrams
  - Routing Functionality Inside the JTR
- ## Ongoing Migration Planning May Reduce the Dependency on These Types of Functions

HAIPIS

- HAIPE Interoperability Standard (HAIPIS) Began As a Way to Achieve Interoperability Between Commercially Developed High Assurance Internet Protocol Encryptors (HAIPE)
- JTRS Will Include HAIPIS Compatibility
  - WNW Will Work With HAIPIS 1.3, and Adapt As Required
  - JTRS Networking Spirals Will Track HAIPIS Versions
- HAIPIS v2.0 and Beyond Is Moving From a Single Specification (Must, Should, and May), to Core Requirements and Optional Modules, With Application Guidance for Specific Environments

- HAIPIS Is Evolving to Include Several Emerging Requirements Critical to JTRS:
  - Low Data Rates
    - Require Improved Efficiency, While Maintaining Security
  - Orders of Magnitude More HAIPE Devices, With Multiple Local and Remote HAIPE Connections Require Red/Black Routing
  - Packet Routing Must Track Dynamic Connectivity
  - Quality of Service
  - IPv6 and Transition
  - Secure Multicast
  - Mobility Support

Crypto Modernization

- JTRS Basic Architecture Supports Crypto Modernization Goals
  - Programmable Crypto and Waveform Software.
- Current Developments Are Initial Phases
  - Legacy Waveforms, Legacy Crypto Emulation
  - WNW for U.S. Use
  - Cluster Radio Sets for U.S. Use
- Crypto Modernization Goals Will Require Additional Developments
  - Cluster Radio Sets Designed for Releaseability
  - Updated Legacy Waveforms With Modernized Crypto
  - Evolving Standards and Protocols for End IA Unit Management
    - Trust Anchor Management
    - Electronic Serial Numbers
    - Cryptographic Message Syntax (CMS)